

Sampler on Rural Drinking Water Research
Centre for Technology Alternatives for Rural Areas (CTARA)
IIT Bombay.

In the water sector, CTARA has been active in Raigad and Thane district. It has done numerous studies in groundwater modelling, groundwater regulation, analysis of water supply schemes, gram panchayat level reporting, simulations, optimization and feasibility studies. Many of the reports describing this work are available on line at:

www.cse.iitb.ac.in/~sohoni/TD603 or www.cse.iitb.ac.in/~sohoni/water

- **The Gudwanwadi Checkdam Project, 2005:** This project aimed at relieving the drinking water stress of Guwanwadi village in Karjat taluka of Raigad district. An 85m long earthen structure was created with technical inputs from Gangotree, community participation from residents and coordination by CTARA. The project was moderately successful—the stress relief was for about 4 months. There was increased availability of water till about March, every year.

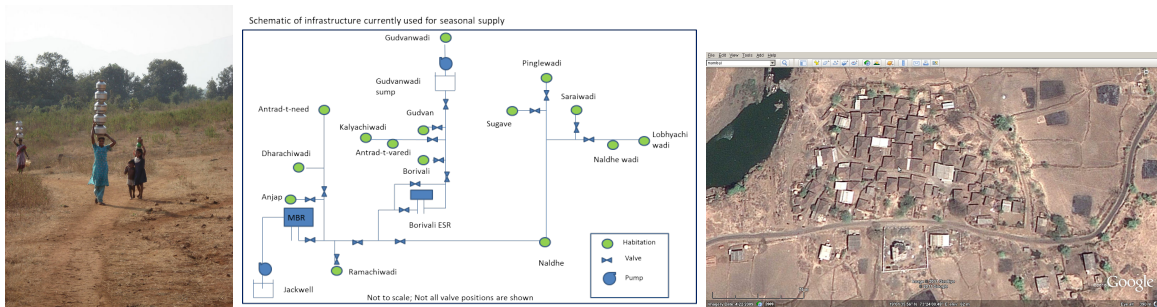


- **Jal-Swarajya Review, 2007.** This study was in collaboration with TISS and Prayas, Pune. The study visited all the ongoing (roughly 35) Jal-Swarajya projects of Thane district to do an assesment of best practices. These findings were reported partly in student theses at CTARA. Our conclusions were that (i) about a third of the projects had failed, and (ii) groundwater source failure was a major reason for failure, and (iii) source strengthening was not undertaken in most projects.

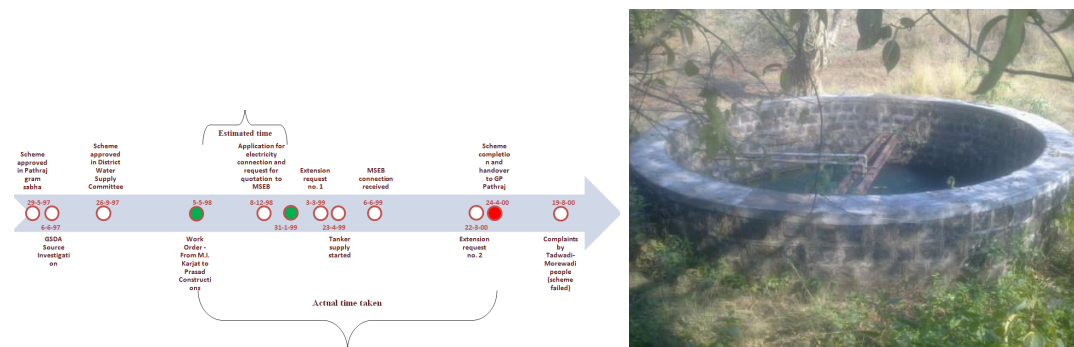
- **North Karjat rural regional scheme: Feasibility Study, 2010.** This study focused on the feasibility of a rural regional scheme supplying drinking water to an area covering about 70 habitations across more than 6 Gram Panchayats with a design population of about 30,000. The source was Pej river. We used innovative optimization techniques and the use of GIS to aid design. We found that for 40 lpcd, the investment cost came to Rs. 2200 per capita while for 200 lpcd it came to Rs. 7500 per capita. The results were presented to local stake-holders including the Tehsildar, Shri Girase, the MLA, Shri Suresh Lad. Six GPs adopted the report in their gram sabhas and presented their demand to MJP.



- **Anjap-Sugave Multi-village scheme analysis, 2011.** This study focused on a poorly performing rural regional scheme, viz., the Anjap-Sugave scheme of Karjat taluka, Raigad district. The study showed that there were several design issues which resulted in poor performance of the scheme. Poor community mobilization and inordinate delays had further complicated the situation. Key assets such as one of the ESRs and the WTP remained incomplete and the other ESR remained untested. These results were presented to all stake-holders including the CEO, Shri Abhijit Bangar and Minister for Rural Development, Shri Jayant Patil. The study also included a plan for the scheme's revamp. Karjat's Konkan Gyanpeeth College of Engg. (KGCE) followed this up with a review in 2012.

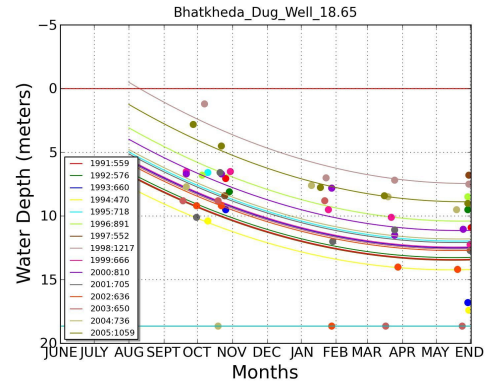
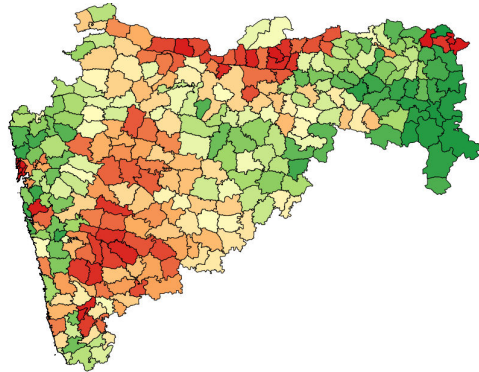


- Failure analysis of the Tadwadi-Morewadi Single-Village Scheme, 2011.** This work studies the reasons behind the failure of a single-village scheme for two tribal *wadis*. tadwadi and Morewadi are one of the most stressed habitations of the taluka and have been so for decades. We found that the proposed scheme was poorly designed with an obvious error in the height of the ESR. Furthermore, the source well was closer to another wadi which had made a formal representation about this. The ultimate cause of the failure was that the pump was stolen. Currently, this well now has a huge private well adjacent to it and a bungalow-plot scheme using this water. This now requires an application of the groundwater act.

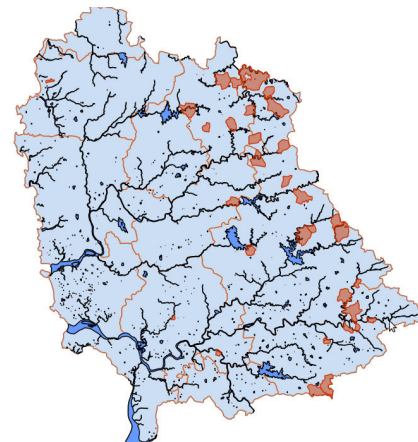
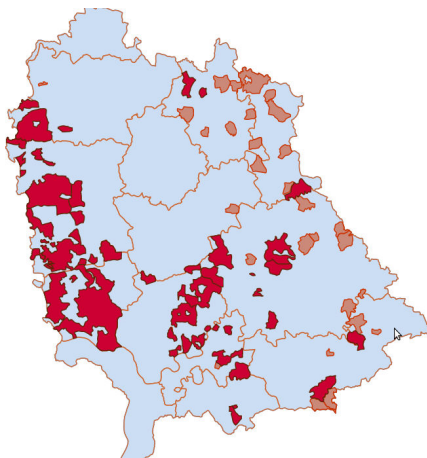


- Regional Groundwater Modelling based on GSDA datasets, 2012.** This work was in collaboration with GSDA. Based on the observation well data of GSDA, we built groundwater models aimed at predicting groundwater levels at different locations and different times of the year. The study focussed on Thane, Sangli and Latur as example districts. key conclusions were that (i) goodness of fit was more in Thane and Latur than in Sanglis, (ii) the goodness of fit increased substantially when rainfall totals and

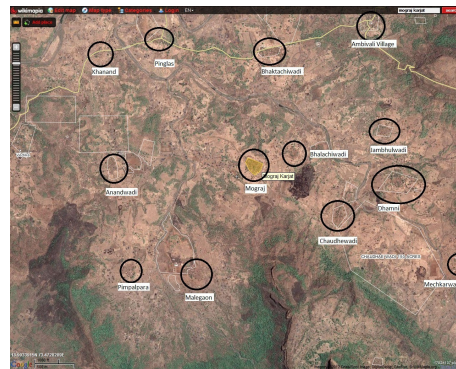
peak rainfalls were also recorded. The study also verified the wisdom of shallow and deep aquifers and the difference in models for dug-wells and bore-wells.



- Thane District regional analysis of drinking water, 2012.** This study focused on the use of GIS and statistical and data representation techniques to analyse drinking water stress. This work was in collaboration with the Thane district administration, and is ongoing. the methodology involved using district administration data, ground-truthing it and using GIS and other data to draw conclusions. We saw that Shahpur, and esp. Murbad, showed a higher risk of failure for tribal wadis. We also saw that elevation was a major reason of failure. The second observation was that areas of large investments for PWS and those of stress were largely disjoint. This calls for investments in regional PWSS for areas of Mokhada and Jawhar.



- Mograj GP level study and data analysis.** This study picked up Mograj GP of Karjat for a deeper analysis. We visited each *wadi* and mapped every water-related asset. On comparing the DDWS dataset with ground observations, we saw grave discrepancies. Most schemes attributed as working were actually non-functional. There were a few conflicts where a clear implementation of groundwater regulations would benefit communities. We developed a *shallow reporting* protocol to aid district administrations and residents in assessing and reporting stress. This part of the work was done with KGCE, Karjat.



VillageName	HabitationName	SchemeNameDP	SanctionYear	SchemeType	Estimated Cost	DateOfCommencement	sourceTypeCategory	TypeOf Source	locationWater Source	Status as per CTARA survey as of March 2012	
1	AMBIWADI T.	AMBIWADI T.									
2	AMBIWADI T.	KOTHAL KHALATI	2008-2009	Piped Water Supply Scheme	25 00000	31/03/2009	Surface Water	River		Functional	
3	AMBIWADI T.	AMBIWADI	2008-2009	Piped Water Supply Scheme	25 00000	31/03/2009	Ground Water	Openwell	near village	Repeated	
4	DHAMNI	CHODHARWADI	2000-2001	Hand Pump	0 35000	14/01/2000	Ground Water	Deep Tubewell	near field	Functional	
5	DHAMNI	DHAMANI DUGWELL	2005-2006	DUG WELL	0 35000	01/09/2005	Ground Water	Openwell	in village	Functional	
6	MECHKARWADI	MECHKARWADI PWSS	2002-2003	Piped Water Supply Scheme	13 32000	30/05/2003	Ground Water	Openwell	NEAR VILLAGE	Functional	
7	MECHKARWADI	MECHKARWADI PWSS	2002-2003	Piped Water Supply Scheme	13 32000	30/05/2003	Ground Water	Openwell	near village	Failed for one wadi	
8	PACHKHADAKWADI	DHAMANI DUGWELL	2005-2006	DUG WELL	0 35000	01/09/2005	Ground Water	Openwell	near village	No data	
9	KHANAND	BHALAYACHIWADI	2005-2006	DUG WELL	2 21000	20/04/2005	Ground Water	Openwell	in wadi	Functional	
10	KHANAND	khanand pwss	2008-2009	Piped Water Supply Scheme	12 61000	12/06/2008	Surface Water	Pond		Not working	
11	KHANAND	KHANAND VILLAGE TANK	2008-2009	DUG WELL	11 57000	07/12/2008	Ground Water	Openwell	Near village	Seasonal	
12	MALEGAON T	JAMBHULWADI	2005-2006	Hand Pump	0 35000	20/04/2005	Ground Water	Deep Tubewell	in village	Functional	
13	MALEGAON	malegaon pwss	2007-2008	Piped Water Supply Scheme	4 06000	30/03/2008	Ground Water	Openwell		Failed	
14	MOGRAJ	ANANDWADI	MOGRAJ ANANDWADI PWSS	2003-2004	Combined Water Supply	6 27000	25/05/2003	Ground Water	Openwell	NEAR FIELD	Failed
15	MOGRAJ	BHAKTACHIWADI	BHAKTACHIWADI PWSS	2002-2003	Piped Water Supply Scheme	6 26000	30/05/2003	Ground Water	Deep Tubewell	NEAR VILLAGE	Failed
16	MOGRAJ	Mograj	2008-2009	Piped Water Supply Scheme	4 08000	30/03/2009	Ground Water	Openwell	near village	Failed	
17	MOGRAJ	MOGRAJ WELL	2008-2009	DUG WELL	4 08000	07/12/2008	Ground Water	Openwell	Near village	Seasonal	
18	PIMPALPADA	pimpalpada pwss scheme	2008-2009	Piped Water Supply Scheme	4 44793	31/03/2008	Surface Water	Treated Surface Water		Failed	
19	PIMPALPADA	PIMPALPADA WELL	2007-2008	DUG WELL	4 44000	31/03/2008	Ground Water	Openwell		No data	
20	PINGLAS	Pinglas WSS	1998-1999	Piped Water Supply Scheme	43 00000	26/04/2000	Surface Water	River		Failed	
21											
22											

Source: <http://indiawater.gov.in>

- Ikharicha-pada GW simulation of watershed intervention.** Ikharicha pada is a tribal hamlet of Mokhada taluka in Thane district which faces frequent drinking water shortage. Aroehan, a regional NGO had intervened in 2010 with several subsurface structures around the drinking water well to recharge it. This was found to be reasonably successful and Aroehan wishes to duplicate this in other *wadis*. We did a GW simulation of the situation using MODFLOW and a proprietary software called GMS to understand the effect of individual structures and the efficacy of each. This analysis will be used in the design of further interventions.

